Please amend claims 1, 4, 5, 11, 31, and 36 as follows:

C1

1. (Thrice Amended) An optical logic circuit, comprising:

a substrate comprising a first material;

an optical layer overlaying the substrate at least partially comprising a second material, the optical layer configured to provide a plurality of optical pathways, the optical pathways including a first optical pathway configured to transmit an optical bias signal having a wavelength and a phase, a second optical pathway configured to provide a modulated optical input signal having the same wavelength and phase as the optical bias signal, and a third optical pathway configured to provide an optical output signal; and

an interference region at least partially comprising the second material, configured to selectively cause interference of wavefronts of the optical bias signal and the modulated optical input signal entering the interference region, the interference being based on the location of the first optical pathway with respect to the second optical pathway entering the interference region and the length of the interference region and the location of the third optical pathway relative to the first and second optical pathways, the location of the third optical pathway being a function of the wavelength and the length of the interference region and the distance between the first and second optical pathways,

wherein the optical output signal is a Boolean logic output signal based on the optical input signal and the optical output signal exits an interference region output.

C2

4. (Twice Amended) The optical logic circuit of claim 1, wherein the interference region is configured to cause substantial cancellation of light exiting the interference region when light is provided to the interference region in the form of the modulated optical input signal.

5. (Twice Amended) The optical logic circuit of claim 1, wherein the interference region includes a first selective optical input receiving the modulated optical input signal and a second selective optical input receiving a second modulated optical input signal.

C3

11. (Thrice Amended) An optical logic gate for an optical processor, comprising:

a substrate configured of a first material;

a patterned optical layer overlying the substrate at least partially configured of a second material, the patterned optical layer providing a plurality of optical conduits of the second material, at least two of the optical conduits configured to receive optical input signals, each of the optical input signals having the same phase, at least one of the optical conduits configured to provide optical output signals, and at least one of the at least two optical input signals being an optical bias input signal; and

an interference region coupled to at least two of the optical conduits configured to receive optical input signals, selective interference being caused along a predetermined axis in the interference region, the interference being based on the location of the first optical pathway with respect to the second optical pathway entering the interference region and the length of the interference region and the location of the third optical pathway relative to the first and second optical pathways, the location of the third optical pathway being a function of the wavelength and the length of the interference region and the distance between the first and second optical pathways, and the interference region being coupled to at least one of the optical conduits configured to provide optical output signals,

wherein the interference region is configured to provide a Boolean logic output signal based on the at least one optical input signal.

C4

31. (Thrice Amended) A method of providing a Boolean logic optical output signal based on at least two optical input signals, comprising:

providing an optical bias input signal to a first optical input such that the optical bias input signal is in an always on condition;

providing a plurality of optical pathways formed of optical transmission material patterned on a substrate material;

providing a second selective optical input signal;

providing a distance between the plurality of optical pathways entering the interference region, the interference region enabling selective interference of the optical

bias input signal and the second selective optical input signal al ng a predetermined axis in the interference region, the interference being based on the location of the first optical pathway with respect to the second optical pathway entering the interference region and the length of the interference region and the location of the third optical pathway relative to the first and second optical pathways, the location of the third optical pathway being a function of the wavelength and the length of the interference region and the distance between the first and second optical pathways; and

providing an optical output signal, the optical output signal based on the at least two input signals and representative of a Boolean logic function.

36. (Thrice Amended) An optical logic circuit, comprising:

a substrate comprising a first material;

an optical layer overlaying the substrate at least partially comprising a second material, the optical layer being patterned to provide a plurality of optical pathways, at least two optical pathways configured to provide optical input signals, the optical input signals being of the same phase, and at least one optical pathway configured to provide an optical output signal; and

an interference region configured to selectively cause interference of wavefronts of light from the optical input signals entering the interference region, the interference being based on the location of the first optical pathway with respect to the second optical pathway entering the interference region and the length of the interference region and the location of the third optical pathway relative to the first and second optical pathways, the location of the third optical pathway being a function of the wavelength and the length of the interference region and the distance between the first and second optical pathways, the selective interference being produced along a predetermined axis in the interference region,

wherein the interference region is configured to provide a Boolean logic output signal based on the at least two optical input signals.